WHAT IS CLAIMED IS:

1. A method for designing a low drag aircraft comprising:
configuring a vertical fin with a "waisted" area to minimize the integral of the second order derivative of cross-sectional area of the aircraft in the vicinity of the vertical fin.

2. The method according to Claim 1 further comprising:
determining the "waisted" area of the vertical fin in the vicinity of a horizontal stabilizer.

3. The method according to Claim 1 further comprising:
determining the "waisted" area for the vertical fin at the juncture of an inverted V-tail.

4. The method according to Claim 1 further comprising:
determining the "waisted" area for the vertical fin at the juncture of a strake.

5. The method according to Claim 4 further comprising:
configuring the strake with a "waisted" area.

6. The method according to Claim 1 further comprising:
determining optimum configurations for the "waisted" area of the vertical fin for at least two Mach numbers;
weighting the configurations for the at least two Mach numbers; and
averaging the weighted configurations to determine a final configuration.

7. The method according to Claim 6 further comprising:
determining weighting factors for the at least two Mach numbers based on a percentage of time the aircraft is expected to fly at each Mach number during typical flight profiles.

8. The method according to Claim 1 further comprising:

determining weighting factors for the at least two Mach numbers based on at least one of the group of: minimized drag and minimized sonic boom disturbance.

9. The method according to Claim 1 further comprising:
minimizing the thickness of the vertical fin subject to a constraint of a minimum closure angle at the trailing edge of the vertical fin.

10. The method according to Claim 1 further comprising:
optimizing the aircraft configuration for cross-sectional areas along Mach angle lines.

11. The method according to Claim 1, further comprising:
determining weighting coefficients for design variables to maintain thickness constraints

12. The method according to Claim 1, further comprising:
determining weighting coefficients for nth order derivatives using orthogonal functions to represent respective thickness variables.

13. An aircraft comprising:
an area ruled vertical fin configured to minimize the rate of change of cross-sectional area of the aircraft in the vicinity of the vertical fin.

14. The aircraft according to Claim 13 further comprising:
an area ruled strake coupled to the root of the vertical fin, wherein the root of the vertical fin and the tip of the strake are configured with a "waisted" area.

15. The aircraft according to Claim 14 further comprising:
a fuselage coupled to the root of the strake.

16. The aircraft according to Claim 14 further comprising:
an inverted V-tail coupled to the vertical fin.

17. The aircraft according to Claim 13, wherein the tip of the vertical fin is configured with a "waisted" area.

18. An aircraft design system comprising:

logic instructions operable to:

apply area ruling theory to the tail section of the aircraft, including configuring a vertical fin with a "waisted" area to minimize the rate of change of cross-sectional area of the aircraft in the vicinity of the vertical fin.

19. The system according to Claim 18 further comprising:

logic instructions operable to:

configure a strake coupled to the vertical fin with a "waisted" area to minimize the rate of change of cross-sectional area of the aircraft, wherein the strake is coupled to the fuselage of the aircraft.

20. The system according to Claim 18 further comprising:

logic instructions operable to:

analyze perturbations of design variables along Mach angle lines.

21. The system according to Claim 18 further comprising:

logic instructions operable to:

configure the tip and root of the vertical fin with "waisted" areas.

22. The system according to Claim 18 further comprising:

logic instructions operable to:

determine optimum configurations for the "waisted" area for at least two Mach numbers;

apply weighting factors to the optimum configurations for at least two Mach numbers, wherein the weighting factors are based on avoiding flow conditions that choke flow in a channel formed by the vertical fin and an inverted V-tail; and

average the weighted configurations to determine a final configuration.

23. The system according to Claim 18 further comprising:
a processor configured to execute the logic instructions; and
a memory coupled to the processor, wherein the memory is configured to store the logic instructions.

24. The system according to Claim 18 further comprising:
logic instructions operable to:
analyze the performance of the aircraft using linear theory.

25. The system according to Claim 18 further comprising:
logic instructions operable to:
analyze the performance of the aircraft using non-linear theory.

26. The system according to Claim 18 further comprising:
logic instructions operable to:
reflect the vertical fin about an inverted V-tail coupled to the vertical fin and determine the waisted area of the vertical fin at a particular flight condition to avoid choked flow between the vertical fin and inverted V-tail.

27. An apparatus comprising:
an area ruled vertical fin configured to minimize the rate of change of cross-sectional areas of the apparatus, wherein the vertical fin includes a "waisted" area.

28. The apparatus according to Claim 27 further comprising:
a body coupled to the root of the vertical fin, wherein the vertical fin includes the "waisted" area at the juncture of the body.

29. The apparatus according to Claim 27 further comprising:
a horizontal stabilizer coupled to the vertical fin, wherein the vertical fin includes the "waisted" area at the juncture of the horizontal stabilizer.

30. The apparatus according to Claim 27, wherein the vertical fin includes a plurality of the "waisted" areas.